Title

Psychometric properties of the Cognitive and Behavioural Responses Questionnaire (CBRQ) in adolescents with Chronic Fatigue Syndrome

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Conflicts of Interest

TC is the author of several self-help books on chronic fatigue for which she has received royalties. TC /KCL has received ad hoc payments for workshops carried out in LTCs. KCL have received payments for TC's editor role in JoMH. KR has co-authored a book with TC called "Overcoming Chronic Fatigue in Young People" for which she receives royalties. ML, SV and SA have no conflicts of interest to declare.

Abbreviations

CBRQ – Cognitive and Behavioural Responses Questionnaire
CBT – Cognitive Behaviour Therapy

CFS – Chronic Fatigue Syndrome

Abstract

Background: To better understand the maintenance of chronic fatigue syndrome (CFS), a valid and reliable measure of cognitive and behavioural responses to symptoms is required. Such a measure could also assess beliefs and coping behaviours in the context of fatigue in other somatic conditions.

Aims: We aimed to establish the psychometric properties of both the Cognitive and Behavioural Responses Questionnaire (CBRQ) and its shortened version (CBRQ-S) in adolescents with CFS.

Method: The full questionnaire was completed by a clinical cohort of adolescents (N = 121) presenting to specialist CFS units in the UK.

Results: Both the CBRQ and CBRQ-S had good internal consistency. The CBRQ scores were strongly associated with depression, anxiety, school and social functioning, but weakly associated with fatigue and physical functioning, providing evidence of validity.

Conclusion: Both the 40-item and the 18-item versions of the CBRQ were found to be reliable and valid in adolescents with CFS. To minimise unnecessary burden, the 18-item version is favoured. Using this assessment tool in future studies, including intervention studies, may help to better target interventions during clinical practice and improve outcomes.

Keywords: cognitive, behavioural, CFS, adolescents, psychometric

Background

The diagnosis of chronic fatigue syndrome (CFS) is made on the basis of ongoing and severe fatigue, which results in a significant reduction in functioning and is not explained by exertion or another medical condition (NICE, 2007). Patients may experience a number of additional symptoms such as pain, post-exertional malaise, cognitive problems, nausea and dizziness (NICE, 2007). Approximately 1 to 2% of children and young people are affected by CFS (Brigden, Loades, Abbott, Bond-Kendall, & Crawley, 2017) and from middle adolescence onwards, CFS is more prevalent in females at a ratio of 2:1 (Crawley, 2014).

CFS impacts significantly on young people's lives; for example, adolescents with CFS miss significant periods of school as a result of their fatigue, and struggle to return to full time education (Crawley & Sterne, 2009; Sankey, Hill, Brown, Quinn, & Fletcher, 2006). The rates of recovery from CFS in adolescents tend to be much more favourable than those in adults, with treatment trials showing that around two thirds of adolescents treated using cognitive behaviour therapy (CBT) are much improved at 6 months follow-up (Lloyd, Chalder, & Rimes, 2012; Nijhof, Bleijenberg, Uiterwaal, Kimpen, & van de Putte, 2012). Despite this, the evidence points towards significant and chronic impairment in functioning in a substantial minority (approximately one third) of adolescents with CFS who do not improve, even with treatment (Brigden et al., 2017).

Cognitive and behavioural factors are postulated to contribute to the maintenance of CFS (Browne & Chalder, 2006; Butler, Chalder, Ron, & Wessely, 1991; Chalder, Deary, Husain, & Walwyn, 2010; Knoop, Prins, Moss-Morris, & Bleijenberg, 2010; Lloyd et al., 2012). Cognitive factors include beliefs about the dangers of undertaking activity (fear avoidance beliefs) and beliefs about self-efficacy, whilst behavioural factors include avoidance of activity, prolonged rest and all-or-nothing behaviour (that is, periods of high activity followed by periods of inactivity), also referred to as booming-and-busting. Adults with CFS endorse these beliefs (Cella, White, Sharpe, & Chalder, 2013; Stahl, Rimes,

& Chalder, 2014) and their cognitive interpretations of the meaning of symptoms have been found to be related to physical and psychological outcomes (De Gucht, Garcia, den Engelsman, & Maes, 2017). Importantly, unhelpful beliefs mediate change during CBT (Chalder, Goldsmith, White, Sharpe, & Pickles, 2015; Stahl et al., 2014).

To further refine and improve the existing, relatively effective cognitive behavioural approach to treatment for adolescents with CFS, we need to better understand the maintenance of the illness. Some measures of beliefs and coping in CFS exist and have been used in studies examining CFS in adolescents. For example, Richards, Turk, and White (2005) used an adapted version of an Exercise Beliefs Questionnaire to investigate beliefs about activity and exercise in CFS. A 4 item version of this questionnaire was originally used in an adult randomised controlled trial of CBT versus relaxation (Deale, Chalder, Marks, & Wessely, 1997). Beliefs were found to change in the CBT but not the relaxation group (Deale, Chalder, & Wessely, 1998). Items were chosen as they were in keeping with the cognitive behavioural model of CFS (Surawy, Hackmann, Hawton, & Sharpe, 1995; Wessely, Butler, Chalder, & David, 1991). Although the scale appeared to have some predictive validity and has been used in adults and adolescents with CFS, the psychometric properties of the measure were not reported and the brevity of the measure limits the richness of the resultant data.

Other options include the Illness Perceptions Questionnaire (Weinman, Petrie, Moss-Morris, & Horne, 1996) and the Illness Management Questionnaire (Ray, Weir, Stewart, Miller, & Hyde, 1993) which have been used in previous studies of adolescents with CFS (Gray & Rutter, 2007; Haines, Loades, & Davis, 2019). However, although psychometric evaluations have been carried out in adult populations (Ray et al., 1993; Weinman et al., 1996), extensive psychometric evaluation has not been carried out in adolescents with CFS. A review of available patient-reported outcome measures for use in paediatric CFS highlighted the lack of psychometric data and the need for rigorous

evaluation of measures (Haywood, Collin, & Crawley, 2014). Therefore, a valid and reliable measure of cognitive and behavioural responses to the symptoms of CFS in adolescents is required.

In the absence of age appropriate measures for use in adolescents, existing adult measures can be adapted if necessary. The potential shortcoming of this approach is that measures developed for use in adults may not capture issues of relevance to adolescents specifically. The alternative is to develop measures from scratch, specifically for use in this population. Whilst this bespoke approach has the benefit of maximum developmental appropriateness, it is time consuming and limits the extent to which findings can be compared to the adult literature. As the cognitive and behavioural models of CFS in adolescents draw on the same cognitive and behavioural responses of CFS in adults, we opted to evaluate an existing measure, the Cognitive and Behavioural Responses Questionnaire (CBRQ), which was developed and validated for use in adults (Moss-Morris & Chalder, 2003; Ryan, Vitoratou, Goldsmith, & Chalder, 2018).

The CBRQ is a 40 item self-report questionnaire (Ryan et al., 2018). Psychometric evaluation to date has found it to have 7 subscales; five are cognitive subscales which assess fear avoidance, catastrophizing, damage beliefs, embarrassment avoidance and symptom focusing. Of these, the first 4 subscales assess thinking patterns, whilst symptom focusing assesses attentional processes. The remaining two subscales pertain to behavioural patterns capturing avoidance/rest and all-or-nothing behaviours. The development of the CBRQ was reported in a Conference abstract (Moss-Morris & Chalder, 2003) and has subsequently been used to assess cognitive and behavioural responses in adults with CFS after treatment (Chalder et al., 2015; Stahl et al., 2014). Ryan et al (2018) aimed to rectify the absence of published formal psychometric evaluation. They found the CBRQ to be valid and reliable in this population, with satisfactory internal consistency ($\alpha \geq 0.76$) and low to moderate correlations with measures of physical and occupational functioning, fatigue, anxiety and depression (Ryan et al., 2018). Both seven-factor and eight-factor solutions showed a

good fit, and the authors opted for the former on the basis of parsimony. A shortened 18-item (6 subscale) version, developed on the basis of exploratory and confirmatory factor analyses, was found to have good psychometric properties ($\alpha \geq 0.67$) in adults (Ryan et al., 2018).

However, despite its potential utility in furthering the understanding of the maintenance of fatigue and in examining the mechanisms of change, the psychometric properties of the CBRQ have not been explored in adolescents with CFS. Therefore, the aim of the current study was to undertake a psychometric evaluation of the original and the shortened version of the CBRQ in adolescents with CFS, using the subscales generated from factor analyses with adults with CFS (Ryan et al., 2018). This was achieved firstly, by examining reliability (internal consistency). Secondly, we examined validity; as there are no other established measures of cognitive and behavioural responses to fatigue, we utilised other measures of impairment (fatigue, functioning, mood and anxiety) which we would expect to be moderately (but not strongly) correlated with the total score on the cognitive and behavioural responses scale. Specifically, we expected that:

- Higher levels of fatigue, and more anxiety and depression symptoms would be associated with more unhelpful cognitive responses to symptoms, (convergent validity) based on previous literature (Ebata & Moos, 1991; Garber, Weiss, & Shanley, 1993; Jolly & Dykman, 1994).
- Similarly, higher levels of fatigue, anxiety and depressive symptoms would be associated with more avoidance/resting behaviour.
- Embarrassment avoidance would be more likely to be associated with school and social functioning (convergent validity) than physical functioning (discriminant validity).
- Disability and mood would not be strongly correlated with all-or-nothing behaviour as based on qualitative research (Hareide, Finset, & Wyller, 2011; Parslow et al., 2018) we expected this behavioural pattern may enable the individual to preserve their mood (discriminant validity).

- Measures of disability (physical, social and school functioning) would be associated with behavioural avoidance-rest patterns (convergent validity).

Method:

Participants

From August 2010 to January 2012, adolescent (age 11-18 years) consecutive attenders at two specialist CFS units in London were invited to participate as part of a research study. Data collection continued at one site as a routine audit of clinical practice until October 2017. In total, across both sites, 207 adolescents attended an initial assessment, 135 of whom had a confirmed diagnosis of CFS. One hundred and twenty one (89.6%) of those with a CFS diagnosis participated in the study.

Measures

Demographic information and self-reported percentage school attendance were recorded.

Cognitive and Behavioural Responses Questionnaire – Adolescents completed the 40-item CBRQ (Ryan et al., 2018). Each item is presented as a statement (e.g. 'Physical activity makes my symptoms worse') and respondents are asked to respond to a 5 point Likert scale. For the cognitive items, 0 = strongly disagree, 4 = strongly agree, and for the behavioural items, 0 = never, 4 = all the time (see table 1). Two items (FA2 and FA9) are reverse scored, and higher scores indicate more unhelpful cognitive and behavioural responses. Scores on each item are summed to generate total scores for each of the 7 subscales which form the 40-item CBRQ. In adults, the 18 item, shortened version of the CBRQ (CBRQ-S) had better psychometric properties than the 40-item version (Ryan et al., 2018). The 18 items are scored in the same way as in the 40-item version, and form 6 subscales. In the current study, we evaluated both the 40-item version and the 18-item version (see table 1 for the 18-item version, supplementary materials S1. for the 40-item version).

The following measures were used to assess construct validity, both convergent and discriminant validity. Where measures were available that have previously been used in adolescents with CFS, or validated for use in adolescents, these were selected.

Fatigue – the Chalder Fatigue Questionnaire, CFQ (Chalder et al., 1993) consists of 11 items assessing the severity of mental and physical fatigue. Each item is rated on a 4 -point scale with reference to the past month. Higher scores indicate more severe fatigue. The CFQ has been used extensively in samples of adolescents with CFS, including in treatment trials (Brigden et al., 2016; Lloyd et al., 2012). Cronbach's alpha in this sample was .89.

Physical Functioning –the Short Form 36 physical functioning scale, SF36PFS (Ware & Sherbourne, 1992) is composed of 10 items, each of which describe activities of daily living. Respondents are asked to indicate the extent to which they are limited by their health in each activity on a 3 -point scale. Higher scores indicate better functioning. This measure is considered to be valid and reliable and has been used previously in adolescents with CFS (Chalder et al., 2010; Stulemeijer, de Jong, Fiselier, Hoogveld, & Bleijenberg, 2005). Cronbach's alpha was .91.

School and social adjustment – the Work and Social Adjustment Scale, WSAS (Mundt, Marks, Shear, & Greist, 2002) contains 5 items which respondents are asked to rate, on a 9 point scale, their functioning in work, domestic, social and leisure activities and close relationships. 'School/college' was substituted for 'work' in this study, hence the sale will be referred to as the School and Social Adjustment Scale (SSAS). Higher scores indicate more impairment. Cronbach's alpha was .81.

Anxiety – the State Trait Anxiety Inventory, STAI (Spielberger, 1983) is made up of 40 items which assess, on 4 points, the extent of felt anxiety, both state anxiety experienced in response to specific

threats or stressors (STAI-S), and trait anxiety which is sensitivity to threat more generally (STAI-T). Higher scores indicate more anxiety. The STAI has been used previously in adolescent CFS samples (Smith, Martin-Herz, Womack, & Marsigan, 2003). Cronbach's alpha was .93 (STAI-S) and .92 (STAI-T).

Depression – the Children's Depression Inventory, CDI (Kovacs, 1992) is composed of 27 items, each rated on 3 point scales, which enquire about depressive symptoms including negative mood, ineffectiveness, anhedonia, low self-esteem and interpersonal problems, over the last fortnight. Higher scores indicate lower mood. The CDI has previously been used in adolescents with CFS (Nijhof, Bleijenberg, Uiterwaal, Kimpen, & van de Putte, 2011).Cronbach's alpha was .90.

Procedure

All 11-18 year olds who were offered an initial assessment at a specialist CFS unit were invited to participate. The questionnaires, and a letter of invitation explaining the use of this data for research and audit purposes were enclosed with the initial assessment appointment letter and posted to all these patients. At appointment, the study was discussed, a patient information sheet shared. Older adolescents (age 16-18) or parents of younger adolescents (age 11-15) consented to participation in the study. Young adolescents gave their assent, in addition to parental consent.

Ethical Approval

This research was approved by an NHS research ethics committee (LREC, ref 08/H0807/107), and the Research and Development departments at the South London and Maudsley (SLaM) NHS Trust, and Great Ormond Street Hospital. The clinical audit committee of Psychological Medicine Clinical academic group of SLaM also approved the collection of routine outcomes.

Data Analysis Plan

Complete data on the CBRQ at initial assessment was available for 105 of 121 participants, and no item had more than 4.1% missing values. Due to the low percentages of missing values, no imputation method was undertaken. Participants with missing data were excluded analysis-by-analysis to use all available data.

Reliability: The seven subscales were scored using the approach taken in existing studies as shown in Table 2 (Chalder et al., 2015; Ryan et al., 2018; Stahl et al., 2014) and a total score was calculated. With respect to the internal consistency, Cronbach's alpha (Cronbach, 1951), Cronbach's alpha if item deleted (AID), and item-total correlations (ITC)were computed within each subscale. AID and ITC were computed to identify potential problematic items in terms of internal consistency.

Validity: The correlations between the CBRQ total score and each CBRQ subscale score, and the total scores of the SF36PFS, SSAS, CFQ, STAI-S and CDI scales were examined to assess the construct (discriminant and convergent) validity. The correlation was considered to be strong if $r > 0.7$, moderate if $r > 0.5$, and weak if $r > 0.3$ (Rumsey, 2015).

SPSS 24 (SPSS, Inc, Chicago, IL) and Stata 15.0 (StataCorp., 2017) software were used in the analysis.

[insert table 1 here]

Results

The sample consisted of 121 adolescents with CFS, mean age 15 (S.D. 1.71), of whom 86 were female (71.1%). Most of the participants were White British (see table 2 for details).

Reliability (internal consistency): Cronbach's α coefficient for the 40-item scale was 0.91, and for the CBRQ-S (18-item scale) was 0.81. The Item-total correlations within each subscale for the 40-item scale ranged from 0.12 to 0.85, and for the CBRQ-S, from 0.36 to 0.76. and Cronbach's α for each

subscale on the 40-item CBRQ was ≥ 0.70, and ≥ 0.65 on the CBRQ-S (see Tables 3 and 4 for CBRQ-S, and Supplementary Materials S1. and S2. for the 40-item CBRQ).

[insert tables 2, 3, 4 here]

Construct validity: Increased anxiety and depression symptoms were weakly to moderately correlated with more unhelpful cognitive responses to symptoms (Table 5 for CBRQ-S, Supplementary Materials S3. for 40-item CBRQ). However, contrary to our expectations, fatigue was not strongly associated with unhelpful cognitive responses to symptoms, nor with more avoidance/resting behaviour. As predicted, embarrassment avoidance was more strongly associated with school and social functioning (convergent validity) than physical functioning (discriminant validity), although the association between embarrassment avoidance and school and social functioning was weak. As expected, disability was not strongly correlated with all-or-nothing behaviour, but contrary to expectations, all-or-nothing behaviour was weakly correlated with mood. As hypothesised, measures of disability (physical, social and school functioning) were more strongly associated with behavioural avoidance-rest patterns (convergent validity) than with all-or-nothing patterns.

[insert table 5 here]

Discussion

We undertook a psychometric evaluation of both the 40-item version and the 18-item version of the CBRQ in adolescents with CFS. As both versions were comparable, we presented the data from the briefer version in the main paper as it minimises the participant burden, and the data from the longer version as supplementary materials. In summary, we found the 40-item CBRQ and the 18-item CBRQ-S to have good internal consistency and satisfactory construct validity. Some subscales were more reliable than others.

It was notable that the fear avoidance subscale did not perform as efficiently as expected, with lower consistency between items within the subscale. This could reflect a lack of understanding of the questions, which indicates that items may need to be worded differently for this population. The two reverse coded items, one of which was in the fear avoidance subscale, and the other in the damage beliefs subscale, both scored particularly low on item-total correlations. Future research could undertake a factor analysis to explore which items cluster together in adolescents specifically, given that the subscales used in the current study were based on a factor analysis conducted in adults (Ryan et al., 2018).

We consider the CBRQ to have good face validity (Ryan et al., 2018). The items appear to reflect aspects of thought and behaviour that may be amenable to change. Correlations were in the expected directions with the CBRQ subscales correlating wit measures of depression, anxiety and school and social functioning (i.e. measures of disability and distress). Beliefs have been found to correlate with disability and distress in other long term conditions including adolescents with chronic pain (Gauntlett-Gilbert & Eccleston, 2007) and fibromyalgia (Schanberg, Kredich, Keefe, Lefebvre, & Gil, 1996). In the current study, correlations were in the expected directions, with, for instance, school and social functioning being associated with all CBRQ subscales (convergent validity) apart from all-or-nothing behaviour (discriminant validity). This makes sense as those who engage in all-or-nothing behaviour, doing lots on some days and very little on others, might well be better able to preserve their school and social functioning to some extent. This pattern is described by adolescents with CFS in qualitative studies (Hareide et al., 2011; Parslow et al., 2018). Engaging in avoidance/rest behaviour more consistently and endorsing embarrassment avoidance beliefs was associated with poor school and social functioning, which again, would be expected (convergent validity). Determining the predominant activity pattern may have important treatment implications, as a predominance of all-or-nothing behaviour is likely to require activity stabilisation prior to gradually

increasing activity levels (Heins, Knoop, Burk, & Bleijenberg, 2013). The behavioural subscales of the CBRQ may provide a means to gather information about activity pattern as part of the assessment process.

However, scores on the CBRQ subscales were not significantly correlated with fatigue or with physical functioning. The exception was fear avoidance which was associated with both fatigue and physical functioning, and all-or-nothing behaviour which was associated with fatigue. The fact that fear avoidance correlates with fatigue and physical functioning implies that fear avoidance may be key in a model of CFS in adolescents. Similarly, all or nothing behaviour may be central in understanding the perpetuation of fatigue in this context. It is a more surprising finding that the CBRQ total score did not correlate with physical functioning (SF36PFS), even though it did correlate with school and social functioning. It may be that the items on the SF36PFS, designed to assess activities of daily living in adults (e.g. the item 'lifting or carrying groceries'), are not as relevant to adolescents. An item such as 'lifting or carrying a heavy school bag' may be more appropriate. However, despite this, the reliability of the scale was high in the current study.

In the future, the CBRQ may provide a useful way to examine the extent to which cognitive and behavioural factors maintain fatigue, and the mechanisms of change during treatment for CFS. Adolescence is the developmental stage where individuals develop autonomy and independence from their parents. In this context, beliefs may not be stable, and may change more rapidly than in adults. Furthermore, parental illness beliefs may continue to be important in influencing the illness beliefs and coping of adolescents (Chalder et al., 2010), particularly as being ill may have disrupted normal adolescent development and impacted on the process of individuation (Taylor, Loades, Brigden, Collin, & Crawley, 2017). Therefore, parental illness beliefs as well as those of the adolescent themselves will be important to investigate in future studies.

Strengths and Limitations

Our consecutive recruitment of adolescents presenting to a specialist CFS unit is likely to have limited selection bias, although our sampling was restricted to those attending specialist services. Therefore, the results might not be generalizable to those who are too severely affected to attend, or those who are mildly affected and are managed in primary care. We recruited more females than males, which is expected, based on the epidemiology of CFS from adolescence onwards (Crawley, 2014).

We opted to evaluate a measure of cognitive and behavioural responses to symptoms which was originally developed for adults. As such, it is possible that cognitions or behaviours specific to the developmental period of adolescents were missed. As there is no existing measure of cognitive and behaviour responses to symptoms in adolescents, there was no direct comparator available for assessing construct validity. Although this lack of comparable measures poses a problem for psychometric analysis, it also highlights the need for the current study. The psychometric properties of the CFQ and the SSAS, used to assess validity, have also not been established in adolescents. Finally, we did not examine test-retest reliability or sensitivity to change, which will be important to establish prior to using the CBRQ as an outcome measure in treatment trials.

Conclusion

Our study found that both the 40-item and the 18-item versions of the CBRQ were reliable (internal consistency), with some evidence of validity in adolescents with CFS. To minimise unnecessary burden for fatigued adolescents, the 18-item version would be favourable, given that it performed as well as the 40-item version. More psychometric evaluation is required including sensitivity to change and factor structure in adolescents. Our findings suggest that the CBRQ could be a promising measure to use for assessing cognitive and behavioural responses to symptoms. Understanding

more about these responses will enable a more comprehensive assessment in clinical practice at an individual level.

Table 1. Items included on the 18-item CBRQ-S

Item Label	**CBRQ Statement posed to participant with response options 'strongly disagree', 'disagree', 'neither agree nor disagree', 'agree', 'strongly agree'**
FA1	I am afraid that I will make my symptoms worse if I exercise
FA2 (R)	My symptoms would be relieved if I were to exercise
DB4	The severity of my symptoms must mean there is something serious going on in my body
DB9 (R)	Even though I experience symptoms, I don't think they are actually harming me
DB10	When I experience symptoms, my body is telling me that there is something seriously wrong.
FA12	Physical activity makes my symptoms worse
SF5	I think a great deal about my symptoms
SF9	My symptoms are always at the back of my mind
SF12	I spend a lot of time thinking about my illness
EA1	I am embarrassed about my symptoms
EA2	I worry that people will think badly of me because of my symptoms
EA5	I am ashamed of my symptoms
	CBRQ Statement posed to participant with response options 'never', 'sometimes', 'quite often', 'very often', 'all the time'
AL1	I tend to overdo things when I feel energetic
AL2	I find myself rushing to get things done before I crash
AL3	I tend to overdo things and then rest up for a while
L2	I stay in bed to control my symptoms
L7	I tend to nap during the day to control my symptoms
L9	I sleep when I'm tired in order to control my symptoms

AL = All or nothing behaviour, EA = Embarrassment Avoidance Subscale, FA= Fear Avoidance Subscale, DB = Damage Beliefs Subscale, L = Avoidance/Resting Behaviour, SF = Symptom Focusing Subscale; Items denoted with 'R' are reverse scored.

Table 2. Participant demographics and clinical characteristics

		N (%)
Gender	Male	35 (28.9)
	Female	86 (71.1)
Ethnic Origin	White British	86 (71.1)
	Black British	2 (1.7)
	Asian/British Asian	3 (2.5)
	British other	11 (9.1)
	Other European	3 (2.5)
	Other White	11 (9.1)
	Mixed race	4 (3.3)
	Not stated	4 (3.3)

	Range	**Mean (S.D.)**
Age (years)	11-18	15.0 (1.71)
CFQ	5-33	23.1 (5.82)
SSAS	4-40	24.3 (8.05)
SF36PFS	0-100	50.1 (25.33)
CDI	4-40	15.8 (8.47)
STAI-State	20-78	44.7 (12.36)
STAI-Trait	25-73	47.4 (11.57)

CDI = Children's Depression Inventory; CFQ = Chalder Fatigue Questionnaire; SF36PFS = Short-Form 36 Physical Functioning; SSAS = School and social adjustment scale; STAI = State-Trait Anxiety Inventory

Table 3. 18-item CBRQ-S subscale descriptive statistics, internal consistency and stability

	Items included	Range	No of items	N	Mean (S.D.)	Internal consistency (Cronbach's α)
Total (18 items)	FA1, FA2, FA12, DB4, DB9, DB10, SF5, SF9, SF12, EA1, EA2, EA5, AL1, AL2, AL3, L2, L7, L9	11-62	18	115	35.82 (9.90)	.81
Fear avoidance	FA1, FA2, FA12	1-12	3	118	8.20 (2.21)	.65
Embarrassment avoidance	EA1, EA2, EA5	0-12	3	117	4.65 (3.14)	.85
All-or-nothing behaviour	AL1, AL2, AL3	0-12	3	119	5.46 (3.27)	.83
Damage beliefs	DB4, DB9, DB10	0-12	3	119	6.60 (2.36)	.74
Symptom focusing	SF5, SF9, SF12	0-12	3	119	6.34 (2.78)	.81
Avoidance/resting behaviour	L2, L7, L9	0-11	3	115	4.52 (3.12)	.76

AL = All or nothing behaviour, EA = Embarrassment Avoidance Subscale, FA= Fear Avoidance Subscale, DB = Damage Beliefs Subscale, L = Avoidance/Resting Behaviour, SF = Symptom Focusing Subscale.

Table 4. 18-item CBRQ Reliability indices at item level

CBRQ-short version subscale (Cronbach's α)	**Internal consistency**		
	Items	AID	ITC
Fear avoidance (.65)	FA1	.48	.52
	FA2	.68	.36
	FA12	.47	.53
Embarrassment avoidance (.85)	EA1	.79	.72
	EA2	.76	.76
	EA5	.82	.71
All-or-nothing behaviour (.83)	AL1	.73	.72
	AL2	.77	.69
	AL3	.79	.67
Damage beliefs (.74)	DB4	.56	.63
	DB9	.80	.42
	DB10	.56	.64
Symptom focusing (.81)	SF5	.63	.75
	SF9	.82	.57
	SF12	.73	.66
Avoidance/resting behaviour (.76)	L2	.84	.42
	L7	.56	.68
	L9	.54	.69

AID = Alpha if item deleted; ITC = Item-total correlation

Table 5. Pearson's correlation coefficient *r (p-value*) between CBRQ-S and selected measures

Variable	CFQ	SSAS	SF36PFS	CDI	STAI-State	STAI-Trait
Total (18 items)	**0.23** (.016)	**0.36** (<.001)	-0.16 (.094)	**0.67** (<.001)	**0.53** (<.001)	**0.67** (<.001)
Fear avoidance	**0.26** (.006)	**0.33** (<.001)	**-0.49** (<.001)	**0.41** (<.001)	**0.25** (.012)	**0.34** (<.001)
Embarrassment	0.10 (.280)	**0.23** (.013)	-0.02 (.864)	**0.49** (<.001)	**0.49** (<.001)	**0.57** (<.001)
Symptom focusing	0.11 (.256)	**0.28** (.002)	-0.12 (.223)	**0.52** (<.001)	**0.45** (<.001)	**0.52** (<.001)
Damage beliefs	0.13 (.169)	**0.19** (.049)	-0.03 (.783)	**0.38** (<.001)	**0.29** (.004)	**0.39** (<.001)
All-or-nothing	**0.33** (<.001)	0.13 (.155)	-0.17 (.086)	**0.48** (<.001)	**0.25** (.012)	**0.44** (<.001)
Avoidance/rest	0.03 (.787)	**0.19** (.049)	0.05 (.634)	0.17 (.090)	**0.21** (.036)	**0.24** (.014)

CDI = Children's Depression Inventory; CFQ = Chalder Fatigue Questionnaire; SF36PFS = Short-Form 36 Physical Functioning; SSAS = School and social adjustment scale; STAI = State-Trait Anxiety Inventory

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